



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION AND INDOOR AIR
National Air and Radiation Environmental Laboratory
540 South Morris Avenue, Montgomery, AL 36115-2601
(334) 270-3400

June 2, 2009

MEMORANDUM

SUBJECT: Radiochemical Results for
Kansas Radium Dial Site Samples

FROM: John Griggs, Chief *John Griggs*
Monitoring and Analytical Services Branch

TO: Randy Schademann, OSC
Region 7

Attached are data packages for gross alpha and beta analysis of samples collected from the Kansas Radium Dial site in Wichita, KS. The samples constitute NAREL batch numbers 0900021 and 0900022.

Radiochemical analyses usually require the subtraction of an instrument background measurement from a gross sample measurement. Both values are positive, but when the sample activity is low, random variations in the two measurements can cause the gross value to be less than the background, resulting in a measured activity less than zero. Although negative activities have no physical significance, they do have statistical significance, as for example in the evaluation of trends or the comparison of two groups of samples.

For all analyses except gamma spectroscopy, it is the policy of NAREL to report results as generated, whether positive, negative, or zero, together with the 2-sigma measurement uncertainty and a sample-specific estimate of the minimum detectable concentration (MDC). The activity, uncertainty, and MDC are given in the same units. The activity and 2-sigma uncertainty for a radionuclide measured by gamma spectroscopy are reported only if the nuclide is detected; so, the results of gamma analyses are never zero or negative. Nuclides that are not detected do not appear in the report, with the exception of Ba-140, Co-60, Cs-137, I-131, K-40, Ra-226, and Ra-228. If one of these seven nuclides is undetected, NAREL reports it as "Not Detected," or "ND," and provides a sample-specific estimate of the MDC.

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Superfund

Specific information concerning all aspects of the radiological analysis of the samples is contained in the batch case narratives of the data packages. If you have any questions concerning the analytical results, please contact me at (334)270-3450.

Attachments

cc: Robert Dye, Region 7, w/o attachments
Ron Fraass, NAREL

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
ALPBET ANALYSES**

REPORT OF SAMPLE DELIVERY GROUP #0900021

Project: Region 7 - Kansas Radium Dial Site, Wichita, KS
 Analysis Procedure: Gross Alpha and Beta on Solid Samples
 Report ID: 0900021-ALPBET
 Report Type: Original
 Date Reported: 05/28/2009
 Total Pages in Report: 37

SAMPLES

NAREL Sample #	Client Sample ID	Type	Matrix	Date Collected	Date Received
A9.02906E	650-SB-BG1 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02907F	650-SB-BG2 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02908G	650-SB-7-2 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02909H	650-SB-10-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02910A	650-SB-10-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02911B	650-SB-13-1 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02912C	650-SB-13-1 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02913D	650-SB-13-2 (0-3.5 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02914E	650-SB-13-2 (3.5-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02915F	650-SB-13-3 (0-1 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02916G	650-SB-13-3 (1-2 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02917H	650-SB-13-3 (2-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02918J	650-SB-17-1 (0-3 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02919K	650-SB-17-1 (3-4 FT)	SAM	SOIL	03/26/2009	04/02/2009
A9.02920C	650-SS-9-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02921D	650-SS-12-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02922E	650-SS-23-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02923F	650-SS-24-1	SAM	SOIL	03/26/2009	04/02/2009
A9.02924G	650-SS-BGA	SAM	SOIL	03/26/2009	04/02/2009
A9.02925H	650-SS-BGB	SAM	SOIL	03/26/2009	04/02/2009

EXCEPTIONS

1. Packaging and Shipping - No problems were observed.
2. Documentation - No problems were observed.
3. Sample Preparation - No problems were encountered.
4. Analysis - No problems were encountered.
5. Holding Times - All holding times were met.

QUALITY CONTROL

1. QC samples - All QC analysis results met NAREL acceptance criteria.
2. Instruments - Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom 6-2-09
Mary F. Wisdom Date
Quality Assurance Manager, NAREL

John Griggs 6/2/89
John G. Griggs, Ph.D. Date
Director, Center for Environmental Radioanalytical
Laboratory Science

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

GENERAL INFORMATION (CONTINUED)

GROSS ALPHA AND BETA ANALYSIS

In comparison to the methods employed to determine radionuclide-specific activities, the method employed by NAREL to determine gross alpha and beta activity has the potential for greater analytical bias. This is especially true for solid samples. It should be noted that this potential analytical uncertainty is not included in the two-sigma counting uncertainty term. Therefore, gross alpha and beta results should be used as gross approximations of the alpha and beta activity present.

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #0900021

ANALYSIS SUMMARY

Analysis Procedure: NAREL GR-03
 Title: Gross Alpha and Beta on Solid Samples

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
A9.02906E		N/A	05/05/2009	0013242L	0005763B
A9.02907F		N/A	05/05/2009	0013242L	0005763B
A9.02908G		N/A	05/26/2009	0013282V	0005800N
A9.02909H		N/A	05/26/2009	0013282V	0005800N
A9.02910A		N/A	05/26/2009	0013282V	0005800N
A9.02911B		N/A	05/26/2009	0013282V	0005800N
A9.02912C		N/A	05/26/2009	0013282V	0005800N
A9.02913D		N/A	05/05/2009	0013242L	0005763B
A9.02914E		N/A	05/26/2009	0013282V	0005800N
A9.02915F		N/A	05/26/2009	0013282V	0005800N
A9.02915F	DUP	N/A	05/26/2009	0013282V	0005800N
A9.02916G		N/A	05/05/2009	0013242L	0005763B
A9.02917H		N/A	05/26/2009	0013282V	0005800N
A9.02918J		N/A	05/26/2009	0013282V	0005800N
A9.02919K		N/A	05/26/2009	0013282V	0005800N
A9.02920C		N/A	05/26/2009	0013282V	0005800N
A9.02921D		N/A	05/05/2009	0013242L	0005763B
A9.02922E		N/A	05/26/2009	0013282V	0005800N
A9.02923F		N/A	05/26/2009	0013282V	0005800N
A9.02924G		N/A	05/05/2009	0013242L	0005763B
A9.02925H		N/A	05/05/2009	0013242L	0005763B
A9.02925H	DUP	N/A	05/05/2009	0013242L	0005763B
LCS-00559953T *	LCS	N/A	05/06/2009	0013242L	0005763B
RBK-00559954U *	RBK	N/A	05/06/2009	0013242L	0005763B
LCS-00561166T *	LCS	N/A	05/26/2009	0013282V	0005800N
RBK-00561167U *	RBK	N/A	05/26/2009	0013282V	0005800N

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02906E	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.013e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	82.52 %	Analyst:	CHD
Ash/dry weight:	95.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 18:12	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Alpha	3.47e+01	2.3e+01	1.5e+01	PCI/GDRY	05/05/2009
Beta	2.41e+01	5.5e+00	7.0e+00	PCI/GDRY	05/05/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02907F	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.016e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	84.22 %	Analyst:	CHD
Ash/dry weight:	95.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 18:12	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.17e+01	2.2e+01	1.6e+01	PCI/GDRY	05/05/2009
Beta	2.92e+01	5.8e+00	6.9e+00	PCI/GDRY	05/05/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02908G	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.086e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	93.71 %	Analyst:	CHD
Ash/dry weight:	92.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 16:00	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	7.00e+01	3.1e+01	1.7e+01	PCI/GDRY	05/26/2009
Beta	3.30e+01	6.8e+00	8.6e+00	PCI/GDRY	05/26/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02909H	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.051e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	91.62 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 16:00	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	7.97e+01	3.3e+01	2.1e+01	PCI/GDRY	05/26/2009
Beta	4.11e+01	7.5e+00	8.8e+00	PCI/GDRY	05/26/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02910A	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.039e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	87.59 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 16:00	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.70e+01	2.3e+01	2.3e+01	PCI/GDRY	05/26/2009
Beta	2.48e+01	5.9e+00	7.8e+00	PCI/GDRY	05/26/2009

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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02911B	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.065e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	89.17 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 16:00	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.95e+02	5.5e+01	2.2e+01	PCI/GDRY	05/26/2009
Beta	5.66e+01	9.4e+00	9.7e+00	PCI/GDRY	05/26/2009

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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02912C	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.044e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	84.37 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 17:40	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Alpha	6.79e+01	3.1e+01	1.7e+01	PCI/GDRY	05/26/2009
Beta	1.88e+01	5.8e+00	8.1e+00	PCI/GDRY	05/26/2009

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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02913D	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.014e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	84.24 %	Analyst:	CHD
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 18:12	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.27e+03	6.7e+02	1.3e+01	PCI/GDRY	05/05/2009
Beta	5.68e+02	7.7e+01	2.9e+01	PCI/GDRY	05/05/2009

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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02914E	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.050e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	76.22 %	Analyst:	CHD
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 17:40	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	4.72e+01	2.7e+01	2.1e+01	PCI/GDRY	05/26/2009
Beta	3.17e+01	6.6e+00	8.1e+00	PCI/GDRY	05/26/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02915F	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.107e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	86.33 %	Analyst:	CHD
Ash/dry weight:	92.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 17:40	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.38e+03	4.9e+02	2.4e+01	PCI/GDRY	05/26/2009
Beta	4.30e+02	5.7e+01	2.5e+01	PCI/GDRY	05/26/2009

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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02915F	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.113e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	86.33 %	Analyst:	CHD
Ash/dry weight:	92.40 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 17:40	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.15e+03	4.5e+02	2.2e+01	PCI/GDRY	05/26/2009
Beta	4.02e+02	5.2e+01	2.3e+01	PCI/GDRY	05/26/2009

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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02916G	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.013e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	82.50 %	Analyst:	CHD
Ash/dry weight:	90.40 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 18:12	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.52e+02	6.4e+01	1.5e+01	PCI/GDRY	05/05/2009
Beta	6.71e+01	1.0e+01	9.8e+00	PCI/GDRY	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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SDG #0900021

SAMPLE ANALYSIS REPORT

Sample #:	A9.02917H	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.117e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	80.07 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 19:21	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	4.32e+01	2.6e+01	1.7e+01	PCI/GDRY	05/26/2009
Beta	3.09e+01	6.4e+00	8.2e+00	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02918J	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.088e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	84.34 %	Analyst:	CHD
Ash/dry weight:	94.80 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 19:21	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.08e+03	6.3e+02	2.1e+01	PCI/GDRY	05/26/2009
Beta	5.84e+02	7.4e+01	2.8e+01	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
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**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02919K	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.083e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	80.95 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 19:21	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2\sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.43e+01	2.6e+01	2.3e+01	PCI/GDRY	05/26/2009
Beta	3.78e+01	7.0e+00	8.4e+00	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02920C	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.090e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	89.49 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 19:21	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	9.87e+01	3.6e+01	2.2e+01	PCI/GDRY	05/26/2009
Beta	4.57e+01	7.8e+00	8.6e+00	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02921D	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.015e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	91.74 %	Analyst:	CHD.
Ash/dry weight:	96.00 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 19:52	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.39e+01	1.9e+01	1.5e+01	PCI/GDRY	05/05/2009
Beta	2.08e+01	5.1e+00	6.6e+00	PCI/GDRY	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02922E	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.081e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	86.03 %	Analyst:	CHD
Ash/dry weight:	89.20 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 21:01	100.0	G54A	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.78e+02	5.2e+01	1.7e+01	PCI/GDRY	05/26/2009
Beta	4.81e+01	8.7e+00	1.0e+01	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02923F	QC batch #:	0005800N
Matrix:	SOIL	Assay batch #:	0013282V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.111e-01 GDRY	Analysis procedure:	NAREL GR-03
Dry/wet weight:	86.97 %	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 21:01	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
Alpha	1.03e+02	3.7e+01	2.1e+01	PCI/GDRY	05/26/2009
Beta	4.56e+01	7.9e+00	8.8e+00	PCI/GDRY	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02924G	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.009e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	86.84 %	Analyst:	CHD
Ash/dry weight:	91.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 19:52	100.0	G54B	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.70e+01	2.2e+01	1.5e+01	PCI/GDRY	05/05/2009
Beta	3.57e+01	6.4e+00	7.1e+00	PCI/GDRY	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02925H	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.013e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	79.85 %	Analyst:	CHD
Ash/dry weight:	87.60 %	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 19:52	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.53e+01	2.1e+01	1.2e+01	PCI/GDRY	05/05/2009
Beta	2.56e+01	5.4e+00	6.6e+00	PCI/GDRY	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	A9.02925H	QC batch #:	0005763B
Matrix:	SOIL	Assay batch #:	0013242L
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.012e-01 GASH	Analysis procedure:	NAREL GR-03
Dry/wet weight:	79.85 %	Analyst:	CHD
Ash/dry weight:	87.60 %	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 19:52	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.42e+01	1.9e+01	1.5e+01	PCI/GDRY	05/05/2009
Beta	2.95e+01	5.6e+00	6.6e+00	PCI/GDRY	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	LCS-00559953T	QC batch #:	0005763B
Matrix:	N/A	Assay batch #:	0013242L
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-03
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 23:13	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.76e+01	4.0e+00	3.7e-01	PCI	05/05/2009
Beta	1.86e+01	2.2e+00	1.2e+00	PCI	05/05/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	RBK-00559954U	QC batch #:	0005763B
Matrix:	N/A	Assay batch #:	0013242L
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-03
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/05/2009 23:13	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-6.33e-02	3.5e-01	3.7e-01	PCI	05/05/2009
Beta	1.73e-01	3.0e-01	4.6e-01	PCI	05/05/2009

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	LCS-00561166T	QC batch #:	0005800N
Matrix:	N/A	Assay batch #:	0013282V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-03
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 21:01	100.0	G54C	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.99e+01	4.4e+00	6.4e-01	PCI	05/26/2009
Beta	1.74e+01	2.1e+00	1.3e+00	PCI	05/26/2009

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #0900021
SAMPLE ANALYSIS REPORT**

Sample #:	RBK-00561167U	QC batch #:	0005800N
Matrix:	N/A	Assay batch #:	0013282V
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-03
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
05/26/2009 21:01	100.0	G54D	GVJ

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-6.33e-02	4.0e-01	4.8e-01	PCI	05/26/2009
Beta	3.22e-02	3.1e-01	5.0e-01	PCI	05/26/2009

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005763B
Preparation procedure: N/A
Analysis procedure: NAREL GR-03

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02906E		N/A		CHD
A9.02907F		N/A		CHD
A9.02913D		N/A		CHD
A9.02916G		N/A		CHD
A9.02921D		N/A		CHD
A9.02924G		N/A		CHD
A9.02925H		N/A		CHD
A9.02925H	DUP	N/A		CHD
LCS-00559953T *	LCS	N/A		CHD
RBK-00559954U *	RBK	N/A		CHD

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG 0900021

QC BATCH SUMMARY

QC batch #: 0005800N
Preparation procedure: N/A
Analysis procedure: NAREL GR-03

NAREL Sample #	QC Type	Yield (%)	± 2 σ Uncertainty (%)	Analyst
A9.02908G		N/A		CHD
A9.02909H		N/A		CHD
A9.02910A		N/A		CHD
A9.02911B		N/A		CHD
A9.02912C		N/A		CHD
A9.02914E		N/A		CHD
A9.02915F		N/A		CHD
A9.02915F	DUP	N/A		CHD
A9.02917H		N/A		CHD
A9.02918J		N/A		CHD
A9.02919K		N/A		CHD
A9.02920C		N/A		CHD
A9.02922E		N/A		CHD
A9.02923F		N/A		CHD
LCS-00561166T *	LCS	N/A		CHD
RBK-00561167U *	RBK	N/A		CHD

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005763B

Analytical Procedure: NAREL GR-03

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date
00559954U	ALPHA	-6.33e-02 \pm 3.5e-01	2009-05-05
00559954U	BETA	1.73e-01 \pm 3.0e-01	2009-05-05

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
A9.02925H	ALPHA	4.03e+01 \pm 2.4e+01	2.76e+01 \pm 2.2e+01	37.51	-0.78 OK
A9.02925H	BETA	2.92e+01 \pm 6.2e+00	3.37e+01 \pm 6.4e+00	14.19	1.00 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00559953T	ALPHA	1.68e+01 \pm 2.8%	1.76e+01 \pm 4.0e+00	104.74	0.40 OK
00559953T	BETA	1.54e+01 \pm 2.8%	1.86e+01 \pm 2.2e+00	120.82	2.84 OK

Analyst:

C H duBose 06 May 09
duBose, C H

QA Officer:

J. M. McLean 5/6/09

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0005800N

Analytical Procedure: NAREL GR-03

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date
00561167U	ALPHA	-6.33e-02 \pm 4.0e-01	2009-05-21
00561167U	BETA	3.22e-02 \pm 3.1e-01	2009-05-21

LABORATORY DUPLICATES (PCI/GDRY)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
A9.02915F	ALPHA	2.38e+03 \pm 4.9e+02	2.15e+03 \pm 4.5e+02	10.24	-0.70 OK
A9.02915F	BETA	4.30e+02 \pm 5.7e+01	4.02e+02 \pm 5.2e+01	6.66	-0.72 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00561166T	ALPHA	1.68e+01 \pm 2.8%	1.99e+01 \pm 4.4e+00	118.25	1.38 OK
00561166T	BETA	1.54e+01 \pm 2.8%	1.74e+01 \pm 2.1e+00	112.68	1.80 OK

Analyst:

CHdP 28 May 09
duBose, C H

QA Officer:

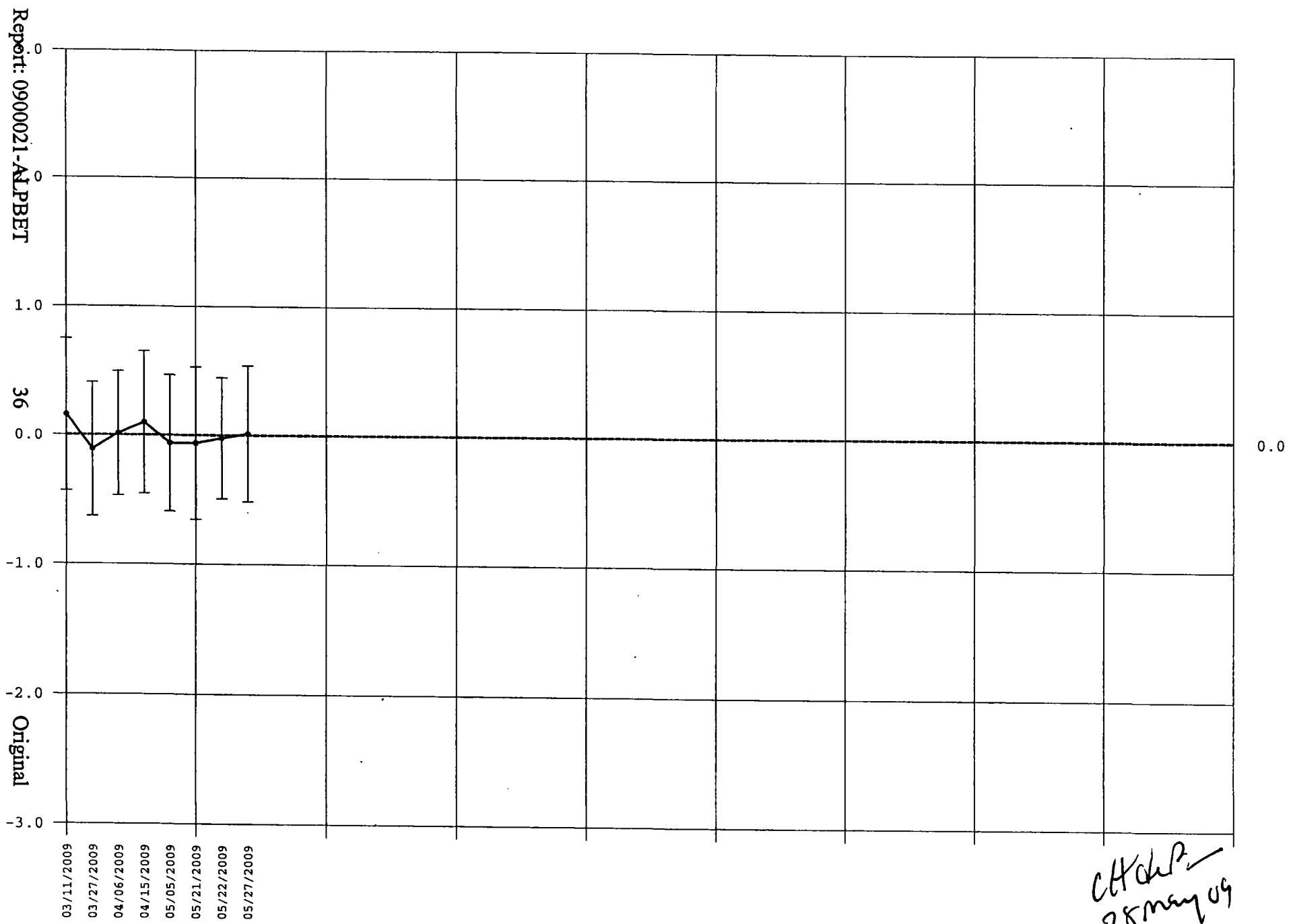
Karen O'Meara 5/28/09

Method Blanks

Analyte: ALPHA

Procedure: NAREL GR-03

Analyst: duBose, C H



Method Blanks

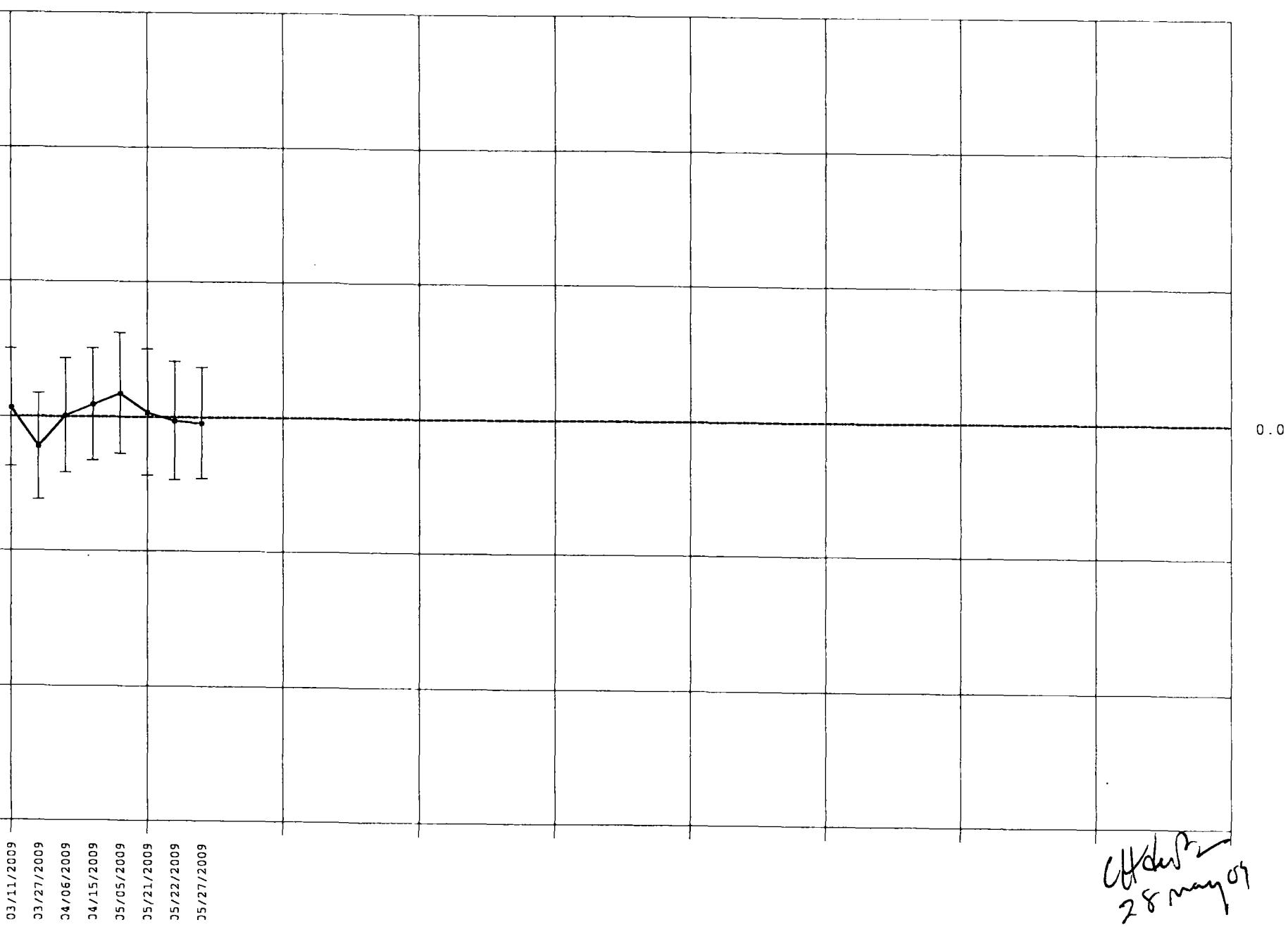
Analyte: BETA

Procedure: NAREL GR-03

Analyst: duBose, C H

Report: 0900021-A&PBET

Original



Officer
28 may 09